

Alternative Power Report

April 16, 2024

News on Alternative Power Sources



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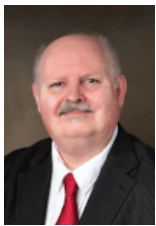
Moving from ICE To Alternative Power

As manufacturers continue to shift their equipment production from ICE to alternative power sources, they need the latest information. That's why analysts at Power Systems Research continue to revise our global data and forecasts to provide the freshest picture available.

Are Sodium Ion Batteries Viable Alternative to Lithium?

Sodium Ion Batteries See Critical Commercialization

By Guy Youngs, Forecast & Adoption Lead



Despite lithium ion battery prices continuing to fall, interest in sodium ion (Na-ion) energy storage has not waned. Sodium ion batteries are undergoing a critical period of commercialization as industries from automotive to energy storage bet big on the technology.

Sodium ion looks well placed, with superior safety, raw material costs, and environmental credentials.

Sodium ion cells, produced at scale, could be 20% to 30% cheaper than the dominant stationary storage battery technology, lithium ferro/iron-phosphate (LFP), primarily due to abundant sodium and low extraction and purification costs. Sodium ion batteries can use aluminum for the anode current collector instead of copper, which is used in lithium ion batteries, further reducing costs and supply chain risks.

Source: *PV Magazine* [Read The Article](#)



PSR Analysis. The potential savings are dependent on scale production, but Sodium Ion batteries suffer from lower energy density and shorter life cycles, and the potential for both of these problems exceeds current lithium ion batteries.

Editor's Note: This monthly report includes news and analysis about EV and alternative power sources such as batteries and fuel cells from analysts at Power Systems Research.

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New power source installations vary across industry segments. Contact PSR for data on your specific application needs.
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New Hydrogen Colors to Watch in 2024 and Why They Matter

Hydrogen has the potential to be emissions free but only if we understand how the hydrogen is generated / manufactured or whether it occurs naturally. Several new terms have been used recently in the press, and this article explains them.

Gold hydrogen refers to naturally occurring deposits of the gas trapped underground in a way similar to how natural gas and oil deposits are found under the Earth's surface. This type of H₂ is different from White in that White now typically refers to the gas when it is above the surface, such as in the atmosphere, but Gold refers specifically to the gas found in underground deposits.

Yellow hydrogen refers to the type of H₂ produced using solar energy. Clear Hydrogen is not yet a specific category on the list of hydrogen colors, but it is a term popping up more frequently this year. It is being used by companies looking for a new designation for their clean methods of H₂ production.

Source: *Hydrogen Fuel News* [Read The Article](#)

PSR Analysis. While using colors to denote the way hydrogen is manufactured, I wonder if this is going too far. Green hydrogen is hydrogen produced using renewable

energy, so why do we need Yellow as a classification, and using Clear as a definition seems pointless.

Study Shows Plug-in Hybrids Aren't as Clean as We Thought

A new report by the European Commission shows that plug-in hybrid electric vehicles create much more emissions than we previously thought – by an average of 3.5 times as much as lab testing indicates.

Plug-in hybrids (PHEVs) were thought to bring the best of both worlds – a large enough battery to take care of your daily tasks, paired with a gas engine for longer trips. There are downsides in cost and complexity, but the powertrain choice does provide more options than others.

For this reason, PHEVs have long been thought of as an ideal transitional technology between gas vehicles and electric ones. People would be able to do most of their driving on electricity and only occasionally use gas. The problem is... that doesn't happen.

Source: *Electrek* [Read The Article](#)

PSR Analysis. There have been a great number of reports that have echoed this in the past, with little follow-up action. Many traditional automotive manufacturers continue to

mass produce these cars, which are often described as very little more than a marketing ploy. However, this report is important because it was produced by a government entity, rather than by NGOs.

CATL, Yutong Launch Long-life EV Battery

CATL has launched a battery pack with Yutong Bus Co to power commercial vehicles like buses and trucks. Yutong said the new battery packs will be used in upcoming electric vehicles and that the new long-lasting EV battery has zero degradation through the first 1,000 cycles.

The new EV battery pack, made with CATL, has a 932,000 mile (1.5 million km), 15-year warranty. Yutong calls the long-life battery an industry first. The bus manufacturer introduced another battery with a 10-year and 621,000 mile (1 million km) lifespan.

Source: *Electrek* [Read The Article](#)

PSR Analysis. Given that you can get 500k KM batteries today, it makes one wonder why we need 1.5m km batteries and are they just an over-engineered product mixed with marketing hype. Most vehicle don't ever achieve 500,000 km before the vehicle itself begins to deteriorate.

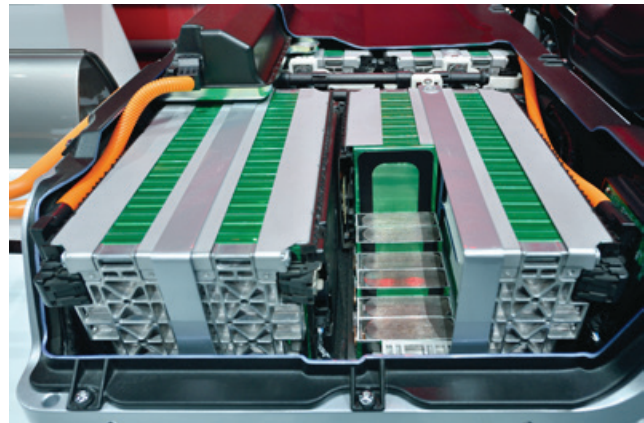
No Graphite? No Problem. Silicon EV Batteries Really Are Coming

China refines nearly 90% of the world's graphite, which is an essential material for nearly all EV battery anodes. Last year, it produced 79% of the world's graphite supply, while North America contributed just 1.2%. China announced a new, more restrictive graphite export approval process last autumn which has had many graphite users very concerned.

Alternative sources could forestall serious damage, enabling graphite EV battery production to continue apace until silicon manufacturing ramps up. Mexico, Canada, and India are among the countries that could help fill supply chain gaps.

Source: *CleanTechnica* [Read The Article](#)

PSR Analysis. While at the time of this writing, China hasn't enacted any of its measures, it does remain a concern. Battery recycling and synthetic graphite are also options to potentially alleviate these supply concerns.



NIO Begins Mass Production of Semi-Solid State Batteries

NIO is celebrating a potentially impactful milestone today. With the help of partner WeLion, NIO has begun mass production of its 150 kWh semi-solid state batteries.

In December 2023, Electrek reported on WeLion's progress in delivering the 360 Wh/kg solid state batteries for NIO, which was going smoothly, with expectations of delivering the cells in mass quantities by April 2024. Now these products appear to be shipping.

Source: *Electrek* [Read The Article](#)

PSR Analysis. While this article doesn't contain a lot of technical details that engineers are keen on seeing, it's encouraging to see that boundaries are being pushed, and we can expect to see more semi-solid state batteries appear in the future.

EV Battery Prices Dropping in 2024, 2025

The good news is battery prices are now falling rapidly, according to Goldman Sachs Research, which expects a nearly 40% decline in battery prices between 2023 and 2025, and for EVs to reach breakthrough levels in terms of cost parity (without subsidies) with internal combustion engine cars in some markets next year.

Goldman Sachs argues that this is because of a mixture of EV battery material costs dropping and EV battery manufacturers continuing to innovate.

Source: *CleanTechnica* [Read The Article](#)

PSR Analysis. The current market for batteries is growing



rapidly, but supply is growing even faster, all of which is good news for EV prices and consumers.

IE's New Hydrogen Fuel Cell Is Smallest and Most Powerful for Passenger Cars

Intelligent Energy (IE), has revealed its new hydrogen fuel cell system for passenger vehicles. This system could be the breakthrough the global passenger car market needs to realize a zero-emission future because this brand new H2 system is smaller and more powerful than any other solution on the market.

The new and patented hydrogen fuel cell system, known as IE-DRIVE™, has been purposefully designed with car manufacturers in mind.

Source: *Hydrogen Fuel News* [Read The Article](#)

PSR Analysis. Being designed to deliver 157kw of power and being designed specifically for passenger cars is a big plus that should help this system stand out and gain some market traction.

A Final Note

Researchers propose **non-aqueous manganese metal batteries**. [Click Here...](#) Weekend Read: A **new battery** worth its salt. [Click Here...](#) This new **solid-state battery** cell claims to set industry records– [Click Here...](#) New Texas **fuel cell gigafactory** pours more cold water on clean power foes– [Click Here](#). **PSR**



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